Space Weather Forecast

Issued on Tuesday 25 February 2025 at 13:17 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Moderate flares likely. Slight chance G1/Minor Storms, mainly Day 4 (28 Feb). S1 Minor Radiation Storm easing, with chance of further enhancements.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with four Moderate class flares, including two notable long-duration events. These were from over the southwest limb at 24/2302 UTC and then at 25/1159 UTC from the largest sunspot region on the disc, in the southwest. This is the most notable of the eleven sunspot regions on the Earth-facing disc, but has a largely simple bipolar magnetic configuration with some maturation of the region likely occurring. The other regions are generally smaller and simpler.

The over the limb flare produced a large and fast Coronal Mass Ejection (CME), however this was far-sided with no chance of impacting Earth. The more recent Moderate-flare has likely produced a CME, and will be assessed once the required imagery is available.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of ongoing slow wind, but with a likely transient CME enhancement. Solar wind speed was background to slightly elevated, rising from 350 km/s at first to peak around 420-450km/s at 24/1900 UTC, before easing back to 370-410km/s. Interplanetary Magnetic Field was Moderate to Strong, peaking between 24/2000-25/0010 UTC, before erratically easing to range be Weak to Moderate. This was mainly Moderately northward but with a Moderately southward period 24/1200-1830 UTC. Geomagnetic activity was mainly Quiet (Kp1-2) but Unsettled to Active (Kp 3-4) between 24/1800-25/0000 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) rose in response to the Moderate flare over the southwest limb and reached the S1 Minor Radiation Storm level 25/0020-1125 UTC, but has since been declining.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is forecast, with isolated Moderate-flares considered likely and a slight chance of Strong-flares.

Solar Wind / Geomagnetic Activity: No CMEs are currently forecast to be Earth-directed, however a weak CME from the Moderate flare and filament eruption early on 24 Feb has the potential to give a glancing impact day 3 (27 Feb). Imagery is needed to assess any potential from

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the likely CME from the Moderate flare peaking 25/1159 UTC. Otherwise, a sequent of fast wind enhancements are likely, with current mainly background slow winds likely becoming Slightly Elevated through day 2-3 (26-27 Feb) and then becoming Strong day 3-4 (27-28 Feb). Geomagnetic activity is expected to be to Quiet to Unsettled, with a chance of Active intervals, and a slight chance of G1 Minor storms, most likely day 4 (28 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is expected to continue declining towards background, but could see a further enhancement day 1-2 (25-26 Feb) due to the Moderate flare that peaked 25/1159 UTC or any further far-sided activity. There also the potential for further enhancements from any further notable flares, giving a slight chance of S1 Minor Radiation Storms later in the period.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	10	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	70	70	70	70
Very Active	R3-R5 (X Class)	No	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	100	25	15	10
Very Active	**≥ S3 ***	No	5	5	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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